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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/825,557	04/14/2004	Takuya Matsumoto	G013-5268	8853

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EXAMINER

HON, SOW FUN

ART UNIT	PAPER NUMBER
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1772

DATE MAILED: 08/02/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

10/825,557

Applicant(s)

MATSUMOTO ET AL.

Examiner

Sow-Fun Hon

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --
Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☐ Responsive to communication(s) filed on ____.
- 2a) ☐ This action is FINAL. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-10 is/are pending in the application.
- 4a) Of the above claim(s) ____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) ____ is/are allowed.
- 6) ☒ Claim(s) 1-10 is/are rejected.
- 7) ☐ Claim(s) ____ is/are objected to.
- 8) ☐ Claim(s) ____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on ____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some * c) ☐ None of:
1. ☒ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. ____.
 3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- * See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☒ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date 12/04, 04/04.
- 4) ☐ Interview Summary (PTO-413)
Paper No(s)/Mail Date. ____.
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: ____.

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DETAILED ACTION***Claim Rejections - 35 USC § 103***

1. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

2. Claims are rejected under 35 U.S.C. 103(a) as being unpatentable over Lub (US 6,660,344).

Regarding claim 1, Lub teaches a liquid crystalline substance (compound) having two oxetanyl groups (dioxetane), hence difunctional, represented by the formula below:

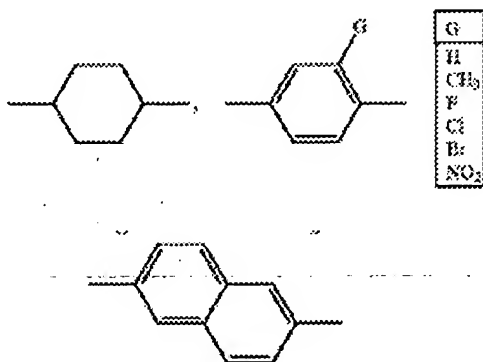


wherein R_1 and R_2 are independently selected from straight or branched C_1 - C_8 alkyl and hydrogen; X and X' are independently selected from oxygen, sulfur, a single covalent bond, $-O-CO-$, $-CO-O-$, and $-O-CO-O-$; Y and Y' are spacer groups having each independently 1 to 30 carbon atoms (linear or branched), in which the carbon chain may be interrupted by oxygen in the ether function or by sulfur in the thioether function; Z and Z' are independently selected from oxygen, sulfur, a single covalent bond, $-O-CO-$, $-CO-O-$, and $-O-CO-O-$; and M is any suitable mesogenic group.

$X, X' = O$; $Y, Y' =$ linear spacer group of 1 to 30 carbons which corresponds to Applicant's $(CH_2)_n, (CH_2)_o$, where the 1 to 30 number of carbons overlap Applicant's n and $o = 0$ to 10; $Z, Z' =$ a single covalent bond, $-O-$, $-O-CO-$, and $-CO-O-$ which corresponds to Applicant's L_3, L_4 ;
 $M = (-O-X'')_m-O-$ wherein $X'' =$ a single bond, $-O-$, $-O-CO-$, $-CO-O-$, which correspond to

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Applicant's L₅ and L₆; p = 0, 1, 2 (column 4, lines 25-40); Q, Q' are aromatic moieties (column 4, lines 45-65) which preferably include:



corresponding to Applicant's P₁ and P₃. Hence formula (I) of Lub corresponds to formula (2) of Applicant. The compound is low molecular weight relative to a polymer.

The difunctional low molecular weight liquid crystalline substance having two oxetanyl groups, is mixed with a prior art mono-oxetane monomer or oligomer disclosed in any of the references mentioned (column 8, lines 45-50). Lub teaches that a prior art mono-oxetane oligomer is an acrylic(ate) which is usually employed for the purposes of photopolymerization (column 1, lines 45-55). A polymer is the homolog of an oligomer. Therefore it would have been obvious to one of ordinary skill in the art at the time the invention was made, to have mixed in a mono-oxetane polymer with its acrylic portion homopolymerized from a monomer with a formula similar to formula (I) of Lub except that the second oxetane functionality is replaced with an acrylic(ate) functionality, in order to obtain an alternate composition, as taught by Lub. The homopolymerized acrylic portion forms a side chain-type polymeric liquid crystal material.

Lub teaches that the liquid crystalline mixture is aligned and then photopolymerized to fix the aligned structure (column 15, lines 25-35), using a 6 micron thickness (cell) (column 15, lines 20-25). A 6 micron thickness constitutes a film.

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Regarding claim 2, although Lub fails to teach the amounts of the mixture components, because Lub teaches that a person skilled in the art will have no difficulty in selecting the compounds which are to be linked, as well as the reaction conditions (column 7, lines 15-20) without undue experimentation and without any inventive effort (column 8, lines 8-11), in the absence of a show to the contrary, it is expected that it would have been obvious to one of ordinary skill in the art at the time the invention was made, to have varied the amounts of the mixture components to obtain the claimed amount of 5 to 100 percent by mol. of the homopolymerized acrylic portion of the mono-oxetane oligomer, in order to obtain the desired physical properties of the film.

Regarding claim 3, although Lub fails to teach the molecular weight of the liquid crystalline substance, because Lub teaches that a person skilled in the art will have no difficulty in selecting the compounds which are to be linked, as well as the reaction conditions (column 7, lines 15-20) without undue experimentation and without any inventive effort (column 8, lines 8-11), in the absence of a show to the contrary, it is expected that it would have been obvious to one of ordinary skill in the art at the time the invention was made, to have varied the amounts of the mixture components to obtain the claimed weight average molecular weight of from 2,000 to 100,000, in order to obtain the desired physical properties of the film.

Regarding claim 4, although Lub fails to teach the claimed amounts of side chain-type polymeric liquid crystalline substance and difunctional low molecular weight liquid crystalline substance, because Lub teaches that a person skilled in the art will have no difficulty in selecting the compounds which are to be linked, as well as the reaction conditions (column 7, lines 15-20) without undue experimentation and without any inventive effort (column 8, lines 8-11), in the

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absence of a show to the contrary, it is expected that it would have been obvious to one of ordinary skill in the art at the time the invention was made, to have varied the amounts of the mixture components to obtain the claimed amount of at least 10 percent by mass or more of the side chain-type polymeric liquid crystalline substance, and the amount of at least 5 percent by mass or more of the difunctional low molecular weight liquid crystalline substance, in order to obtain a film with the desired properties.

Regarding claim 5, Lub teaches that the liquid crystal material contains a photoinitiator (column 8, lines 40-45). Although Lub fails to disclose the species of photoinitiator, because Lub teaches that a person skilled in the art will have no difficulty in selecting the compounds which are to be linked, as well as the reaction conditions (column 7, lines 15-20) without undue experimentation and without any inventive effort (column 8, lines 8-11), in the absence of a show to the contrary, it is expected that it would have been obvious to one of ordinary skill in the art at the time the invention was made, to have used a photo-cation generator as the photoinitiator, in order to obtain the desired photopolymerization conditions.

Regarding claim 6, the term “developing” is interpreted as “aligning”. Lub teaches that the film is obtained by aligning the liquid crystal material on an alignment substrate (rubbed polyimide) and fixing the liquid crystal material in the aligned state by irradiation with light (photopolymerization) and heat treatment (higher polymerization conversion obtained in an annealing step at higher temperatures, column 15, lines 50-60).

Regarding claim 7, although Lub fails to disclose the type of phase orientation of the liquid crystalline material, the claimed nematic, nematic hybrid and smectic phases are expected to be part of the physical characteristics of the liquid crystalline material, and since Lub teaches

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that a person skilled in the art will have no difficulty in selecting the compounds which are to be linked, as well as the reaction conditions (column 7, lines 15-20) without undue experimentation and without any inventive effort (column 8, lines 8-11), in the absence of a show to the contrary, it is expected that it would have been obvious to one of ordinary skill in the art at the time the invention was made, to have selected the type of phase orientation of nematic, nematic hybrid or smectic, in order to obtain the desired display properties provided by the selected phase orientation.

Regarding claim 8, Lub teaches that the liquid crystalline film is used in liquid crystal displays (column 2, lines 60-70), which would make it part of an optical film.

Regarding claim 9, Lub teaches that the liquid crystalline film is used as a circular polarizer (column 9, lines 40-45). A circular polarizer is a quarter wave film, which is a variation of a half wave film, and is a species of a retardation film. Lub also teaches that the liquid crystalline film is used as a color filter (column 9, lines 40-45), which is a color compensation film.

Regarding claim 10, Lub teaches that the liquid crystalline film is used in a liquid crystal display device (column 2, lines 60-70).

Any inquiry concerning this communication should be directed to Sow-Fun Hon whose telephone number (571)272-1492. The examiner can normally be reached Monday to Friday from 10:00 AM to 6:00 PM.

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If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Harold Pyon, can be reached on (571)272-1498. The fax phone number for the organization where this application or proceeding is assigned is (703)872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

S. Hon

Sow-Fun Hon

01/05/05